

REMARKS/ARGUMENTS

Claims 1-36 and 39-43 are pending in this application. Claims 6-10, 15 and 29 are amended to place them in better form for examination. No new matter is added by these amendments. Reconsideration of the application is respectfully requested.

Claim Objections

Claims 6-10, 15 and 29 are objected to by the Examiner due to the fact that a comma (instead of a period) was used to separate the decimal places in the values claimed for the refractive indices recited therein.

In response to the rejection, applicants have amended the subject claims to replace the comma with a period. These amendments are believed to overcome the Examiner's objection to the claims, which should therefore be withdrawn.

Claim Rejections Under 35 U.S.C. §103

On p. 2 in ¶3 of the Office Action, claims 1-27 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,624,486 to Schmidt et al. ("Schmidt") in view of U.S. Patent No. 6,648,957 to Andes et al. ("Andes"). Applicants believe, however, that the Examiner meant to reject not only claims 1-27 but also claims 28-36 and 39-43 as well. The only rejection actually stated in the written portion of the Office Action is that of claims 1-27 (see ¶3 on p. 2). However, on p. 6, ¶11 of the Action the Examiner also applies the Schmidt/Andes combination to claims 28-36 (without stating they are rejected). Further, in ¶12 on p. 7 the Examiner similarly (i.e., without stating they are rejected) applies the same to references against claims 39-43. The "Office Action Summary" page of the Office Action states, moreover that claims 1-36 and 39-43 are pending and are rejected. Applicants therefore have responded herein as if the rejection based on the combination of Schmidt/Andes applies to all of claims 1-27, 28-36 and 39-43. These rejections are respectfully traversed.

Before discussing the prior art cited to reject applicants' claims, however, applicants believe that a brief, non-limiting description of the presently claimed "effect pigments" is in order

to assist the Examiner in focusing upon those features of the claimed pigments which are believed to distinguish them over the cited references.

Applicants' claimed effect pigments (see, e.g., claim 1) have an aluminum core or aluminum alloy core and an aluminum oxide-containing or aluminum oxide/hydroxide-containing layer enveloping the aluminum core or aluminum alloy core. The pigments are obtained by chemical wet-process oxidation of lamellar aluminum pigments or aluminum alloy pigments. The content of metallic aluminum in the aluminum core or aluminum alloy core is not more than 90 % by weight, based on the total weight of the pigment. These effect pigments are characterized in that the oxidized aluminum pigments or aluminum alloy pigments exhibit at least one highly refractive metal chalcogenide layer having a refractive index of > 1.95 , and in that a mixed layer is formed between the highly refractive metal chalcogenide layer and the enveloping aluminum oxide-containing or aluminum oxide/hydroxide-containing layer. Furthermore, the aluminum oxide-containing or aluminum oxide/hydroxide containing enveloping layer has a thickness that is limited to a range of 70 - 300 nm. (Emphasis supplied).

Applicants' Amendment dated February 27, 2008 focused upon various features of the presently claimed effect pigments which are believed to distinguish them over those pigments produced in accordance with the disclosure contained in the Schmidt patent. Those remarks are, therefore, expressly incorporated herein by reference.

One of the features discussed in the prior response as a basis for distinguishing applicants' pigments over the Schmidt reference was the thickness claimed for the enveloping layer of applicants' pigment. In particular, applicants claim a thickness of from 70-300 nm, whereas the prior art (Schmidt) reference teaches to use a thickness of from 1-800 nm and preferably from 50-600 nm. Applicants pointed out that, with regard to this feature in their previous response (see p. 10), Schmidt discloses that as the layer thickness of layer (A) increases (i.e., up to 800 nm, which is $2\frac{1}{2}$ times applicants' upper claimed limit) the pigments of Schmidt repeatedly pass, in succession, through the interference colors, thus providing metallic effect pigments with a strong color flop. In contrast, as taught by applicant, limiting the thickness of the layer to a range of 70-300 nm provides, in contrast to the pigments according to Schmidt, an effect pigment with a soft color flop (see p. 8, lines 10 *et seq.* in applicants' specification).

Notwithstanding the above argument, however, the Examiner states in the present Office Action that, in accordance with MPEP §2144.05, the overlap between the thickness ranges indicates that the pending claims are *prima facie* obvious in view of the Schmidt disclosure. It is well-established, however, that a holding of *prima facie* obviousness can be rebutted by demonstrating, e.g., via an evidentiary declaration under 37 C.F.R. 1.132, that applicants' claimed effect pigment is significantly different, in a novel and unobvious manner, from a pigment produced according to the disclosure contained in a reference (e.g., Schmidt) relied upon to reject the claims.

Applicants are, thus, submitting with this Amendment a "Declaration Under 37 C.F.R. §1.132 of Dr. Frank Henglein", a co-inventor of the present application. As discussed below, the declaration demonstrates that there is a significant difference in structure and appearance of the pigments produced in accordance with the chemical wet process oxidation method recited for use in applicants' claim 1, versus those produced according to the Schmidt reference via a wet chemical process. Applicants submit, moreover, that the structural differences so demonstrated result in the significant difference in the properties, e.g., the "color flop", (i.e., as discussed in applicants' previous response) exhibited by applicants' pigments when compared to those of the pigments described in the Schmidt reference. That is, there is a soft color flop in the case of applicants' pigments vs. a strong color flop for the pigments of Schmidt, which difference is believed to even further distinguish applicants' claimed pigments from those described in the prior art Schmidt reference.

Upon reading the Examiner's statement at p. 3, lines 5-7, it appears to applicants that the Examiner holds the view that a chemical wet process oxidation, i.e., used in producing the presently claimed effect pigments, and a wet chemical process as described in Schmidt, would result in the same pigment. The 1.132 declaration of Dr. Frank Henglein provided with this Amendment clearly demonstrates, however, by way of photographic evidence, that the view set forth in the Office Action is not correct.

Attached as exhibits to Dr. Henglein's declaration are three SEM (i.e., scanning electron microscope) photomicrographs. Exhibit A is a SEM photomicrograph of a wet-chemical oxidized aluminum pigment as recited in, e.g., claim 1 of the present application. Exhibit B illustrates a

pigment produced in accordance with the prior art Schmidt reference. In particular, Exhibit B is a SEM photomicrograph of a wet chemically formed SiO₂ pigment. Exhibit C, on the other hand, for purposes of contrast is an SEM photomicrograph of an uncoated aluminum pigment. The magnification factor in the case of each of the Exhibits A-C is 50,000x.

As may be seen from an examination of the various Exhibits, the surface of the wet chemically oxidized aluminum pigment, i.e., according to the invention of claim 1 (see Exhibit A), is roughened and structured so as to comprise dendritic elevations and depressions. Further details concerning these features are found, for example, at p. 8, lines 10-16 of applicants' specification, which includes an explanation of how the roughened structure described above provides a pigment having a "soft color flop", i.e., in contrast to the pigments according to Schmidt which have a strong color flop (see the discussion above). In particular, the specification states at p. 8, lines 13-16 that, "This strongly roughened metal surface causes greater scattering of incident light in comparison with smooth metal surfaces [e.g., as displayed by the Schmidt pigments]. This in turn contributes to a soft color flop of the effect pigments according to the invention." (Emphasis supplied by applicants). The roughened structure described above is uniquely attributable to the chemical wet process oxidation technique that is specifically recited in applicants' claim 1.

In comparison to applicants' pigment (Exhibit A) the uncoated aluminum pigment shown in Exhibit C has a smooth and flat surface without any such roughening.

We next compare Exhibit B (Schmidt) vs Exhibit A. Exhibit B illustrates, as noted above, an aluminum pigment that has been wet-chemically coated (i.e., in accordance with the disclosure of Schmidt) with SiO₂. As may be discerned from the Exhibit, the subject pigment is provided with a granular surface structure without any roughening as found in the pigments in Exhibit A produced in accordance with the wet chemical oxidation technique. The granular structure is due to small beads of SiO₂ formed on the surface of the coated pigments. Furthermore, as noted above the structure of a pigment has a direct effect on its color flop properties. In contrast to the soft color flop achieved with applicants' pigments, as pointed out, *inter alia*, in applicants' previous Amendment filed in this case (see p. 10), col. 2, lines 37-39 of the Schmidt reference teach that it is an object of the invention recited and claimed therein to particularly provide metallic effect pigments with a strong color flop. (Emphasis provided by applicants).

The Exhibits, thus, clearly support applicants' contention that the chemical wet-process oxidation technique used by applicants, as recited in claim 1, is a "product-by-process" feature that has a significant impact on the structure, appearance and properties of the effect pigment produced thereby such that, as demonstrated above, effect pigments produced in accordance with claim 1 differ significantly in at least their color flop from pigments produced by alternate methods, i.e., such as the wet chemical process taught for use in Schmidt. Applicants recognize that in the case of a product-by-process claim, such as claim 1, it is incumbent upon an applicant to demonstrate that the claimed article is distinguishable over the disclosure contained in the prior art. Applicants submit that they have, thus, met their burden by demonstrating that their claimed pigments have both a different appearance, and different properties, than those disclosed by, e.g., the Schmidt reference.

Schmidt teaches, moreover, that the silicon or aluminum oxide in the pigment is produced by hydrolytic decomposition of organic silicon or aluminum compounds. These organic silicon or aluminum compounds, respectively, are silicon or aluminum alkoxides (see, e.g., col. 6, lines 22-28 of Schmidt) which are reacted with water to form silicon or aluminum oxide hydrate and the respective organic alcohol. There are no oxidative conditions in the reaction as described which can create a surface structure of the "roughened" type as found in applicants' claimed pigments (see, e.g., Exhibit A).

The roughened surface structure that is obtained on the surface of the pigments according to claim 1 is very pronounced. It permits the production of a mixed layer containing a highly refractive metal chalcogenide which, as noted above, produces the desired soft interference color flop described, for example, in the portion of applicants' text beginning at p. 7, line 35.

To summarize, the evidence contained in Dr. Henglein's declaration under 37 C.F.R. §1.132 clearly demonstrates that the pigment recited in claim 1 is not at all the same as, or even obvious in light of, a pigment produced in accordance with the Schmidt reference since, as noted above, applicants' pigment has an entirely different appearance from a pigment according to Schmidt and, in addition, has significantly different color flop properties from the Schmidt pigment. Applicants, thus, respectfully submit that the pigment according to claim 1 is completely distinguishable from the disclosure contained in the Schmidt reference.

Applicants note, however, that Schmidt is not cited by itself against claims 1-27. Rather, Schmidt has been combined by the Examiner with the Andes et al. '957 patent to reject the subject claims. The Andes reference, however, fails to disclose the elements of the invention missing from the Schmidt reference. It is clear from the discussion set forth at p.3, lines 14-20 that Andes '957 is cited by the Examiner due to its teaching that iron oxide is a high refractive index material having a refractive index of greater than 1.8, while silicon oxide is a low refractive index material which has a refractive index of between 1.35 and 1.8. There is no teaching or suggestion in the Andes reference, whether the reference is viewed on its own or in combination with the patent to Schmidt, to produce the pigment via chemical wet process oxidation, which results in a roughened surface (as shown in Exhibit A to the 1.132 declaration provided herewith) which inherently results in a pigment having a desirable soft color flop, i.e., in contrast to the strong color flop exhibited by the pigments produced by, *inter alia*, Schmidt.

For all of the reasons above, therefore, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 1 under §103 based on the combined disclosures of the Schmidt and Andes patents. Moreover, the remaining claims 2-27 all depend, directly or indirectly from claim 1. Thus those claims include all of the features contained in claim 1. Claims 2-27 are, therefore, distinguishable over the cited combination of references for the same reasons as claim 1. The rejection of those additional dependent claims thus should also be withdrawn.

In ¶11 on p. 6-7 of the Office Action the Examiner applied the combination of Schmidt and Andes against applicants' claims 28-36. Claim 28 recites a process for the production of effect pigments according to claim 1. Thus, the features recited in claim 1 are additionally included in claim 28 and those claims which depend from that claim (i.e., nos. 29-36). As such, applicants respectfully submit that claims 28-36 are also distinguishable over the cited combination of references for at least the same reasons as claim 1. The Examiner should, therefore, reconsider and withdraw the rejection of claims 28-36.

Still further, in ¶12 on Office Action pages 7-8, the cited reference combination is applied to claims 39-43. Claim 39 and 42 both depend directly from claim 1 and thus are distinguishable for at least the same reasons as claim 1. Further, claims 40 & 41 depend from claim 39 and claim

43 depends from claim 42. Thus these additional claims are also distinguishable. The Examiner should, therefore, reconsider and withdraw the rejection of claims 39-43.

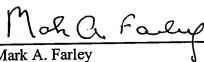
Summary

The claim amendments and arguments presented herein, taken in conjunction with the evidence provided in the Declaration under 37 C.F.R. 1.132 of Dr. Henglein provided herewith, are believed sufficient to overcome all of the Examiner's grounds for objection and rejection which, therefore, should be withdrawn.

If the Examiner does not agree, however, applicants' representative hereby invites the Examiner to telephone him at the number below so that a personal or telephonic interview concerning this case may be scheduled in an effort to overcome any remaining impediments to the issuance of a Notice of Allowance with regard to the entire application.

THIS CORRESPONDENCE IS BEING
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Respectfully submitted,



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